

20



03500.010530.4

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:)
: Examiner: G. Fourson, III
KIYOFUMI SAKAGUCHI, ET AL.)
:)
Application No.: 09/161,774) Group Art Unit: 2823 ✓
:)
Filed: September 29, 1998)
:)
For: PROCESS FOR PRODUCTION OF)
SEMICONDUCTOR SUBSTRATE : November 25, 2003

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

FOURTH INFORMATION DISCLOSURE STATEMENT

Sir:

In compliance with the duty of disclosure under 37 C.F.R. § 1.56 and in accordance with the practice under 37 C.F.R. §§ 1.97 and 1.98, the Examiner's attention is directed to the documents listed on the enclosed Form PTO-1449.

REMARKS

Applicants have cited U.S. Patent Nos. 5,811,348, 6,107,213, 6,194,245, 6,326,280, 6,426,274, and the documents cited therein. Applicants note that the claims of the subject application have been copied from the first listed patent, and that the remaining patents cross-reference that patent.

FORMAL MATTERS

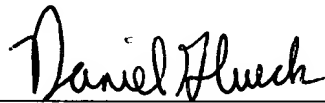
Any fee required in connection with this paper should be charged to Deposit Account 06-1205. A duplicate of this paper is enclosed.

CONCLUSION

It is respectfully requested that the above information be considered by the Examiner and that a copy of the enclosed Form PTO-1449 be returned indicating that such information has been considered.

Applicants' undersigned attorney may be reached in our New York office by telephone at (212) 218-2100. All correspondence should be directed to our address given below.

Respectfully submitted,



Attorney for Applicants
Daniel S. Glueck
Registration No. 37,838

FITZPATRICK, CELLA, HARPER & SCINTO
30 Rockefeller Plaza
New York, New York 10112-3800
Facsimile: (212) 218-2200

DSG/dc
DC_Main 148199 v1

FORM PTO 1449 (modified)

ATTY DOCKET NO.

03500.010530.4

APPLICATION NO.

09/161,774

U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE

APPLICANT

KIYOFUMI SAKAGUCHI, ET AL.

FILING DATE

September 29, 1998

GROUP

2823

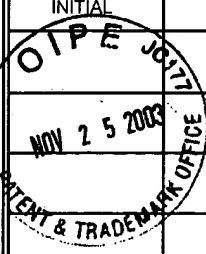
Submitted: November 25, 2003

U.S. PATENT DOCUMENTS

*EXAMINER INITIAL	DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
	4,116,751	09/26/78	Zaromb	156	600	
	4,727,047	02/23/88	Bozler, et al.	437	89	
	5,248,621	09/28/93	Sano	437	3	
	5,250,460	10/05/93	Yamagata, et al.	437	62	
	5,277,748	01/11/94	Sakaguchi, et al.	156	630	
	5,278,092	01/11/94	Sato	437	90	
	5,278,093	01/11/94	Yonehara	437	109	
	5,285,078	02/08/94	Mimura, et al.	257	3	
	5,290,712	03/01/94	Sato, et al.	437	24	
	5,320,907	06/14/94	Sato	428	446	
	5,331,180	07/19/94	Yamada, et al.	257	3	
	5,362,683	11/08/94	Takenaka, et al.	437	226	
	5,363,793	11/15/94	Sato	117	2	
	5,371,037	12/06/94	Yonehara	437	86	
	5,374,564	12/20/94	Bruel	437	24	
	5,403,771	04/04/95	Nishida, et al.	437	89	
	5,433,168	07/18/95	Yonehara	117	90	
	5,453,394	09/26/95	Yonehara, et al.	437	62	
	5,457,058	10/10/95	Yonehara	437	24	
	5,459,081	10/17/95	Kajita	437	3	
	5,466,631	11/14/95	Ichikawa, et al.	437	62	
	5,536,361	07/16/96	Kondo, et al.	156	630.1	
EXAMINER	DATE CONSIDERED					

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

FORM PTO 1449 (modified) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE LIST OF REFERENCES CITED BY APPLICANT(S) (Use several sheets if necessary) Submitted: November 25, 2003				ATTY DOCKET NO. 03500.010530.4		APPLICATION NO. 09/161,774	
				APPLICANT KIYOFUMI SAKAGUCHI, ET AL.			
				FILING DATE September 29, 1998		GROUP 2823	

U.S. PATENT DOCUMENTS							
*EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
		5,644,156	07/01/97	Suzuki, et al.	257	485	
		5,670,411	09/23/97	Yonehara, et al.	437	62	
		5,811,348	09/22/98	Matsushita, et al.	438	455	
		5,854,123	12/29/98	Sato, et al.	438	507	
		5,856,229	01/05/99	Sakaguchi, et al.	438	406	
		5,863,830	01/26/99	Bruel, et al.	438	478	
		5,869,387	02/09/99	Sato, et al.	438	459	
		5,970,361	10/19/99	Kumomi, et al.	438	409	
		5,980,633	11/09/99	Yamagata, et al.	117	94	
		6,103,598	08/15/00	Yamagata, et al.	438	459	
		6,107,213	08/22/00	Tayanaka	438	762	
		6,121,117	09/19/00	Sato, et al.	438	459	
		6,194,245 B1	02/27/01	Tayanaka	438	57	
		6,326,280 B1	12/04/01	Tayanaka	438	409	
		6,426,274 B1	07/30/02	Tayanaka	438	458	

FOREIGN PATENT DOCUMENTS							
		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES/NO/ OR ABSTRACT
	EP	✓ 0417838 A1	03/20/91	EPO			
	EP	✓ 0469630 A2	02/05/92	EPO			
	EP	0499488 A2	08/19/92	EPO			
	EP	0536790 A2	04/14/93	EPO			
	EP	0553852 A2	08/04/93	EPO			
	EP	✓ 0553859 A3	08/04/93	EPO			

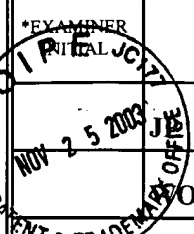
EXAMINER	DATE CONSIDERED
----------	-----------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609, Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

FORM PTO 1449 (modified) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE LIST OF REFERENCES CITED BY APPLICANT(S) (Use several sheets if necessary)				ATTY DOCKET NO. 03500.010530.4		APPLICATION NO. 09/161,774	
				APPLICANT KIYOFUMI SAKAGUCHI, ET AL.			
				FILING DATE September 29, 1998		GROUP 2823	
Submitted: November 25, 2003							
FOREIGN PATENT DOCUMENTS							
*EXAMINER INITIAL		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES/NO/ OR ABSTRACT
EP		0553860 A2	08/04/93	EPO			
EP		0554795 A1	08/11/93	EPO			
EP		0584777 A1	03/02/94	EPO			
EP		0618624 A2	10/05/94	EPO			
EP		0757377 A2	02/05/97	EPO			
EP		0793263 A2	09/03/97	EPO			
EP		0797258 A2	09/24/97	EPO			
GB		2211991 A	07/12/89	United Kingdom			
JP		60-196955 V	10/05/85	Japan			Abstract
JP		62-108539 V	05/19/87	Japan			Abstract
JP		62-279625	12/04/87	Japan			Part Tran.
JP		03-70156	03/26/91	Japan			Abstract
JP		05-211128	08/20/93	Japan			Abstract
JP		05-283722	10/29/93	Japan			Translation
JP		06-45622	02/18/94	Japan			Translation
JP		07-79016	03/20/95	Japan			Abstract
JP		07-211602	08/11/95	Japan			Abstract
JP		07-302889	11/14/95	Japan			Abstract
JP		07-326719	12/12/95	Japan			Abstract
EXAMINER				DATE CONSIDERED			

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

FORM PTO 1449 (modified) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE LIST OF REFERENCES CITED BY APPLICANT(S) (Use several sheets if necessary) Submitted: November 25, 2003		ATTY DOCKET NO. 03500.010530.4	APPLICATION NO. 09/161,774
APPLICANT KIYOFUMI SAKAGUCHI, ET AL.		FILING DATE September 29, 1998	
GROUP 2823			

FOREIGN PATENT DOCUMENTS							
*EXAMINER INITIAL	DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES/NO/ OR ABSTRACT	
	9-162090	06/20/97	Japan			Abstract	
	92/09104	05/29/92	PCT				

OTHER DOCUMENT(S) (Including Author, Title, Date, Pertinent Pages, Etc.)	
✓	T. Abe et al. "Silicon Kesshou to Doping (Silicon Crystal and Doping)", Maruzen Co., Ltd., 1986 (with partial translation)
✓	K. Barla, et al., "SOI Technology Using Buried Layers of Oxidized Porous Si", pp. 11-15 (1987)
✓	H. Baumgart, et al., "Light Scattering Topography Characterization Of Bonded SOI Wafers", Extended Abstracts, Elect. Chem. Soc. 1 st Symp., pp. 375-385 (1991)
✓	G.W. Cullen, ed., Journal of Crystal Growth, vol. 63, no. 3, pp. 429-590, Oct. 1983 (see, e.g., p. 547.)
✓	Extended Abstracts (57 th Autumn Meeting, 1996), The Japan Society of Applied Physics (Abstr. 8a-V-8) (with translation)
✓	Extended Abstracts (44 th Spring Meeting, 1997), The Japan Society of Applied Physics and Related Societies (Abstr. 31a-B-5) (with translation)
*	Extended Abstracts (59 th Autumn Meeting, 1998), The Japan Society of Applied Physics (Abstr. 15a-YB-4) (with translation)
✓	C. Harendt et al., "Silicon on Insulator Material by Wafer Bonding," Journal of Electronic Materials, vol. 20, no. 3, pp. 267-277, March 1991.
✓	Y. Hashimoto, "Shin-Kagaku Yougo Jiten" (New Chemical Term Dictionary), Sankyo Shuppan Co., Ltd., 6 th Edn (1973) (definition of anodic oxidation) (with translation)
✓	R.P. Holmstrom, et al. "Complete dielectric isolation by highly selective and self-stopping formation of oxidized porous silicon," Applied Physics Letters, vol. 42, no. 4, pp. 386-388, Feb. 1983.
✓	C.E. Hunt, et al., "Thinning of Bonded Waters: Etch-Stop Approaches", Extended Abstracts, Elect. Chem. Soc. 1 st Symp., pp. 165-173 (1991)
✓	K. Imai, "A New Dielectric Isolation Method Using Porous Silicon," Solid State Electronics, vol. 24, no. 2, pp. 159-164, 1981.
✓	K. Imai et al., "Crystalline Quality of Silicon Layer Formed by FIPOS Technology," J. of Crystal Growth 63, pp. 547-553 (1983)

EXAMINER	DATE CONSIDERED
----------	-----------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

FORM PTO 1449 (modified) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE LIST OF REFERENCES CITED BY APPLICANT(S) (Use several sheets if necessary) Submitted: November 25, 2003		ATTY DOCKET NO. 03500.010530.4	APPLICATION NO. 09/161,774
APPLICANT KIYOFUMI SAKAGUCHI, ET AL.		FILING DATE September 29, 1998	
GROUP 2823		OTHER DOCUMENT(S) (Including Author, Title, Date, Pertinent Pages, Etc.)	
✓		T. Ito et al. "Porous Silicon Crystal Prepared by Anodization", <u>Applied Physics</u> (Japanese) vol. 57, no. 11, pp. 1710-1720 (1988) (no translation)	
✓		V. Labunov, et al. "Heat Treatment Effect on Porous Silicon," <u>Thin Solid Films</u> , 137 (1986) pp. 123-134	
✓		W.P. Maszara, "Silicon-On-Insulator by Wafer Bonding: A Review", J. Electrochem. Soc., vol. 138, No. 1, pp. 340-347 (1991)	
✓		Kazutoshi Nagano, et al., "Oxidized Porous Silicon and It's Application", Semiconductor Research Lab Matsushita Electric Industrial Co., Ltd. SSD 79-95, pp. 49-54 (no translation)	
✓		Nikkei Microdevice, pp. 76-77 (July 1994) (with translation)	
✓		K. Ogasawara, et al., "Enhancement of Electroluminescence from n-Type Porous Silicon and Its Photoelectrochemical Behavior", J. Electrochem. Soc., vol. 142, no. 6, pp. 1874-1879 (1995)	
✓		M. Ohnishi, et al., "New Type Structures Of A-Si Solar Cell Submodules Fabricated By Microscopic Hole Spacing Technique", Record of the Photovoltaic Specialist Conference, Kissimimee, May 21-25, 1990, vol. 2, No. Conf. 21, pp. 1394-1399, May 21, 1990.	
✓		Patent Abstracts of Japan, vol. 18, No. 066 (E-1501), Feb. 3, 1994 (for JP-5-283722)	
✓		V. Raineri, et al., "Silicon-on-insulator produced by helium implantation and thermal oxidation", Appl. Phys. Lett. 66(26), 3653-3656 (June 1995)	
✓		Sato, et al., Extended Abstracts, <u>Elect. Chem. Soc.</u> , "Epitaxial Growth on Porous Si for a New Bond and Etch-back SOI," vol. 94-1, pp. 705-706 (1994).	
✓		H. Tayanaka, et al., "Thin-Film Crystalline Silicon Solar Cells Obtained by Separation of a Porous Silicon Sacrificial Layer" 2d World Conf. and Exhibition on Photovoltaic Solar Energy Conversion (1998)	
✓		T. Unagami, "Formation Mechanism of Porous Silicon Layer by Anodization in HF Solution," Journal of the Electrochemical Society, vol. 127, no. 2, pp. 476-483, Feb. 1980.	
✓		A. Uhlir, Jr., "Electrolytic Shaping of Germanium and Silicon," The Bell System Technical Journal, vol. XXXV, pp. 333-347, Mar. 1956.	
✓		A. Van Veen, et al., "Helium-Induced Porous Layer Formation In Silicon", Mat. Res. Soc. Symp. Proc., vol. 107, pp. 449-454 (1988)	
✓		T. Yasumata, et al., "Ultrathin Si films grown expitaxially on porous silicon", Applied Surface Science, vol. 48/49, pp. 414-418, May 1991.	
✓		T. Yonehara et al., "Epitaxial layer transfer by bond and etch back of porous Si", Appl. Phys. Lett., 64(16), 2108-2110 (1994)	
✓		Patent Abstracts of Japan, vol. 10, No. 039 (E-381), Feb. 15, 1986 (for JP-A-196955, October 5, 1985)	
EXAMINER		DATE CONSIDERED	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Sheet 5 of 5